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(54) Light signalling device

(57) A light signalling device (1) such as a road hazard warning beacon has fixed electric lights which are intermittently actuated in sequence to give the effect of a moving, flashing light. The lights may be disposed in a circle around the periphery of a central support structure to give the effect of a rotating light. Supply circuitry includes clock timer (10) and counter (7) chips supplied from an AC (13) or DC (14) source. The lights may be filament lamps, discharge tubes or LED's.

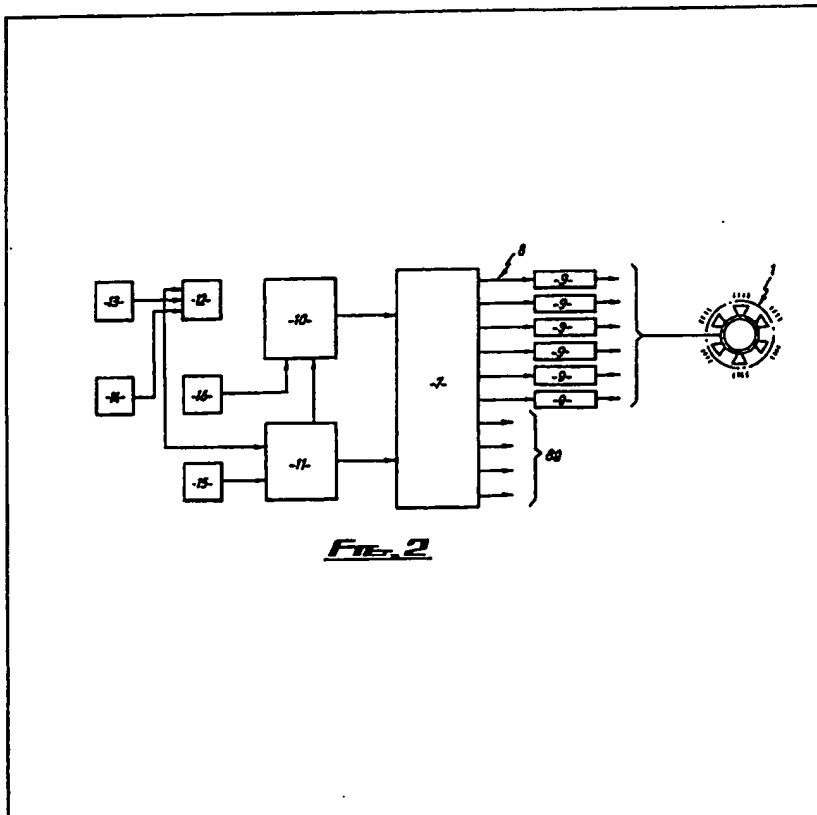


Fig. 2

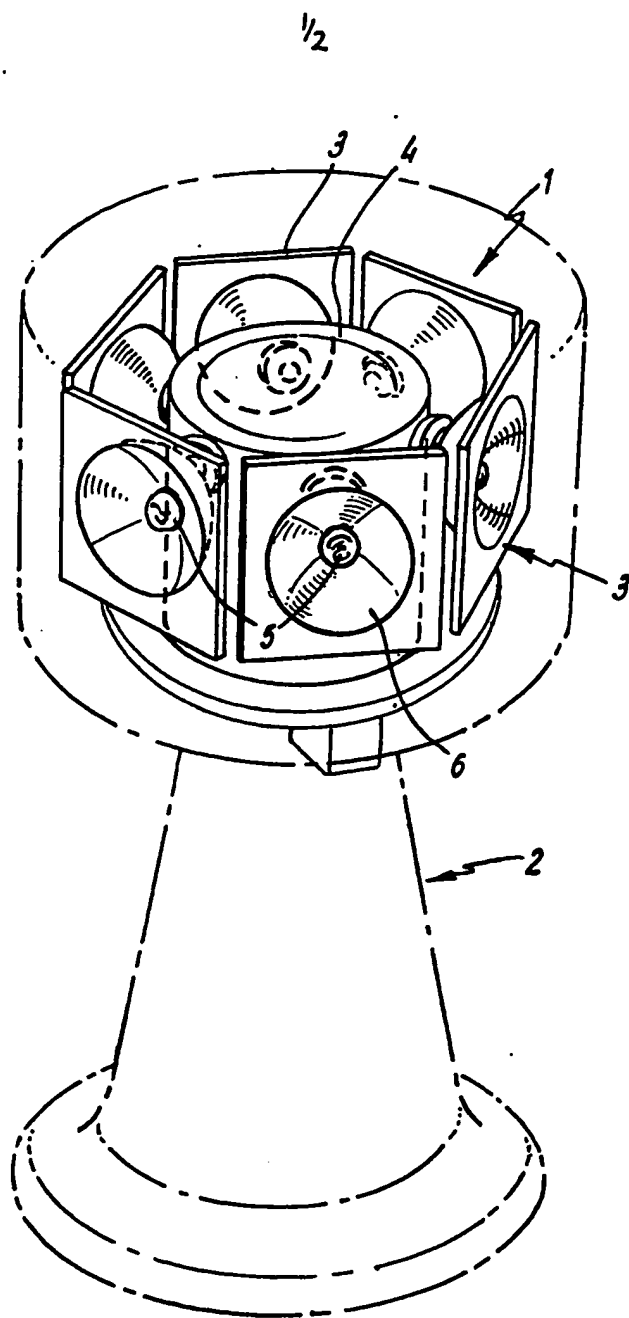
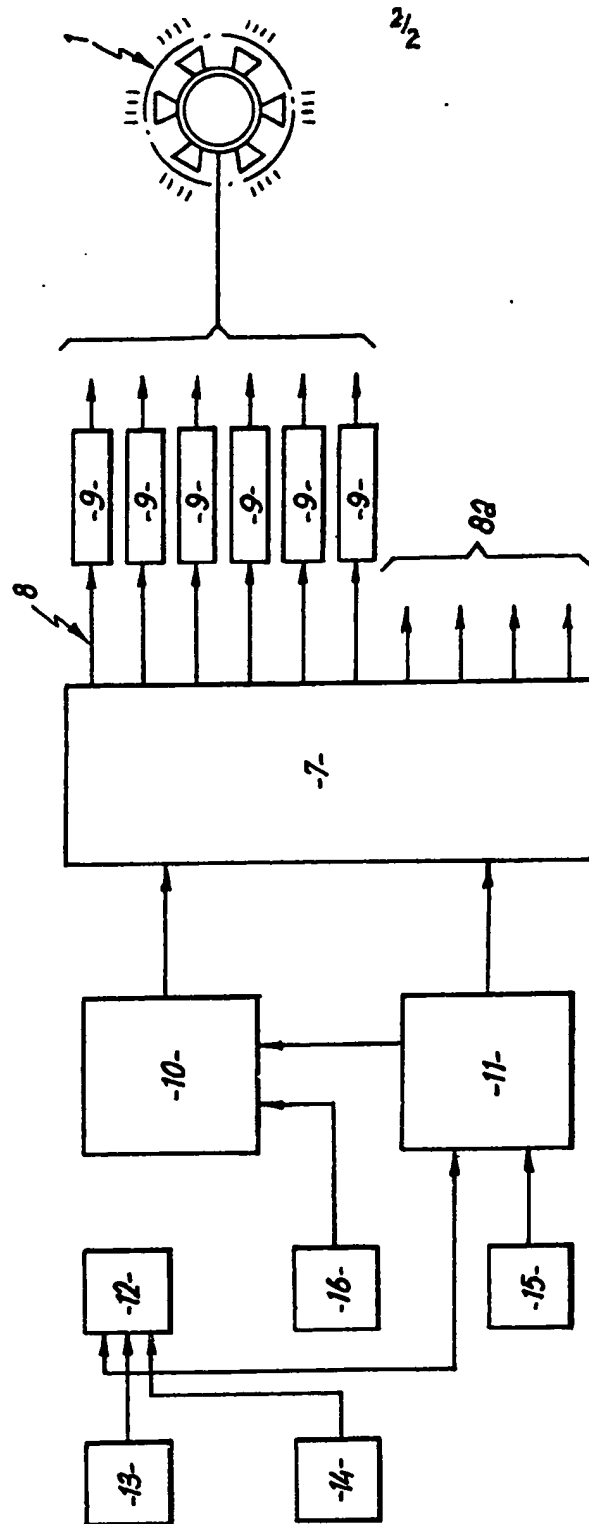


FIG. 1

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SPECIFICATION

Light signalling device

5 This invention relates to light signalling devices such as may be used as warning beacons.

Known warning devices as used for example to mark road hazards, include devices of the kind having a gas discharge tube which is operated by appropriate electrical circuitry to produce a flashing light, and devices which produce a rotating light, for example utilising a reflector which is rotated by means of an electric motor around a fixed central light source. It has been found that a rotating light can be more readily noticeable than a flashing light of similar intensity; however known rotating light beacons can be disadvantageous in so far as they are mechanical and subject to wear.

An object of the present invention is to provide an improved light signalling device which is capable of producing a readily noticeable light.

According to the invention therefore there is provided a light signalling device comprising a support structure, a plurality of electrical lights mounted at different locations on said structure, and an electronic driving circuit connected to the lights and arranged to operate same intermittently in sequence so as to give rise to the production of successive light pulses from said different locations.

30 With this arrangement it will be appreciated that the effect of a moving light source can be produced without requiring any moving parts. Thus, the device can give a readily noticeable light yet can be constructed in a simple and inexpensive manner and can operate safely, reliably and with a low power requirement.

Most preferably, the lights are disposed in a circle peripherally around the support structure and are operated so as to give the effect of a rotating light source.

The lights may take any suitable form and thus may be gas discharge tubes, filament lamps or light-emitting diodes. Reflectors and/or lens systems may be provided.

45 The electronic driving circuitry may take any suitable form and may be arranged to be powered by any suitable power source. In one embodiment the circuitry includes a clock timer device which feeds a counting device so that drive outputs are produced in sequence at different output terminals of the latter device, such outputs being fed via appropriate buffer elements to the lights.

The invention will now be described further by way of example only and with reference to the accompanying drawings in which:-

Figure 1 is a perspective view of one form of a light signalling device according to the invention; and

Figure 2 is a block circuit diagram of the device.

The signalling device, as shown in Figure 1, comprises a light assembly 1 mounted at the top of an upstanding support, and is suitable for use as a free-standing portable warning beacon which can be used to give warning of a road hazard.

The support 2 may be formed from any suitable material and, for example, may comprise a hollow

moulded plastics body.

The light assembly 1 comprises a plurality of light sources 3 mounted at equally spaced positions in a horizontal circle around the periphery of a vertical mounting tube 4. The assembly 1 is rigidly fixed on the support 2 and may be enclosed in a weatherproof casing with transparent side walls.

Each light source 3 comprises an electric light 5 mounted at the centre of a reflector 6 having a highly polished segmental reflecting surface of generally parabolic form. The electric lights 5 are connected to an electronic circuit on a printed circuit board (not shown) which is mounted under and fixed relative to the light assembly 1. The lights 5 may be of any suitable form and, for example, each light may constitute any of the following:-

A Miniature Edison Screw (MES) (or prefocus cap) 6V 0.5a filament (or up to 24v);

85 A Krypton or Argon MES (or prefocus cap) gas filament lamp (3va);

A cluster of light-emitting diodes.

In each case a low power consumption, say up to 2 to 3 watts, at a low voltage, is required to operate each light.

The electronic circuit, as shown in Figure 2, includes an i.c. chip 7 of a decade sequence counter driver divider kind such as an HEF4017BP or an HES4017BP chip. The chip 7 has ten outputs some of which 8 are connected via appropriate buffer stages 9 to the lights 5. Each output 8 is connected to a different respective light 5 and surplus outputs 8a are left unconnected. The next highest output of the chip 7 is connected to a reset connection thereof to achieve cyclic operation.

The chip 7 is connected to the output of a clock timer i.c. chip 10 such as a 555 chip, and a variable voltage protected regulator circuit 11 is connected to both chips 7, 10 to provide a regulated supply voltage of say 8v. The regulator circuit 11 may also be connected to the lights 5 to provide operating power for same in the case where these are of a suitably low voltage, low wattage kind. In the case where higher voltage and/or higher wattage lights are used, the lights 5 may be connected via the buffers 9 to an appropriate source separate from the circuit 11 (e.g. by connection of the buffers direct to the power source used to power the circuit 11). The circuit 11 is powered via a polarity protector 12 from an a.c. supply via a step-down transformer 13 or from a d.c. source 14 such as a battery. The circuit 11 is provided with a d.c. voltage adjusting control 15, for use, as appropriate for adjusting the voltage fed from the circuit 11 the lights 5. The chips are self-regulating, say from 3v to 15v d.c. (18v maximum), and the timer 10 is provided with a speed adjustment control 16.

In use, the timer 10 feeds successive clock pulses to the chip 7, and the outputs 8 of the chip 7 are actuated in sequence at a rate which is determined by but is slower than the rate of feed of clock pulses.

As each output 8 is actuated, the corresponding light 5 is operated to give a pulse of illumination. The connection of the lights 5 to the outputs 8 is such

that the lights 5 are actuated in sequence around the periphery of the beacon thereby to give the effect of a rotating and flashing light source. At any instant only one light 5 is energised (or alternatively energisation of one light may commence as the previously energised light is extinguished), whereby power consumption of the lights can be kept below about 3 watts at all times.

With this arrangement it will be appreciated that a readily noticeable warning light can be produced yet the beacon is of simple inexpensive and reliable construction and requires only a low voltage, low power consumption. Also, the beacon can be used safely in an explosive or inflammable environment since there is no appreciable likelihood of electrical sparking.

It is of course to be understood that the invention is not restricted to the details of the above embodiment which are described by way of example only. Thus, the signalling device need not be in the form of a free-standing beacon but may take any other suitable form. For example, the device may be in the form of a small portable device which can be placed on the ground or temporarily mounted on a car to give warning of a breakdown. The assembly 1 need not be mounted on a purpose-made support but instead may be suitably fixed within an appropriate light fitting of conventional kind. In this case, the purpose-made transparent casing may not be required.

Further in place of the cylindrical tube 4 it is possible to use a multi-faced (polygonal section)

tube. The printed circuit board can be mounted within the tube 4 or indeed at any other suitable position.

Also, the device is not intended to be restricted to use as a road hazard warning device and may be used for any other suitable purpose.

40 CLAIMS

1. A light signalling device comprising a support structure, a plurality of electrical lights mounted at different locations on said structure, and an electronic driving circuit connected to the lights and arranged to operate same intermittently in sequence so as to give rise to the production of successive light pulses from said different locations.

2. A device according to claim 1, wherein the lights are disposed in a circle peripherally around the support structure.

3. A device according to claim 2, wherein the support structure is of tubular form.

4. A device according to any one of claims 1 to 3, wherein the lights comprise filament lamps.

5. A device according to any one of claims 1 to 3, wherein the lights comprise light-emitting diodes.

6. A device according to any one of claims 1 to 5, wherein the circuitry includes a clock timer device which feeds a counting device.

7. A light signalling device substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.